

ABSTRACT OF THE DISCLOSURE

In a spin tunnel magnetoresistive effect film in which a magnetic thin film to which an exchange bias is applied by exchange coupling via an anti-ferromagnetic thin film and a magnetic thin film that detects a magnetic field are laminated, a magnetic thin film or an anti-ferromagnetic thin film (PtMn, PdMn, NiMn) is laminated onto an underlayer (Ta, Zr, Hf), the surface roughness thereof being in the range from 0.1 to 5 Angstroms. A means used to control the surface roughness introduces into the film growing chamber oxygen, nitrogen, hydrogen, or a gas mixture thereof into a vacuum of 10^{-6} Torr to 10^{-9} Torr, reduces the substrate temperature to 0oC or lower during film growth, or oxidizes an underlayer. The lower electrode layer material used is a film laminate of a high-permeability amorphous magnetic material and a non-magnetic metallic layer.